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10/557,694	11/22/2005	Hideo Hada	SHIGA7.033APC	7849
20995 7590 04/01/2008 KNOBBE MARTENS OLSON & BEAR LLP 2040 MAIN STREET FOURTEENTH FLOOR IRVINE, CA 92614				
EXAMINER				
EOFF, ANCA				
ART UNIT		PAPER NUMBER		
1795				
NOTIFICATION DATE		DELIVERY MODE		
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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# Office Action Summary

**Application No.**

10/557,694

**Applicant(s)**

HADA ET AL.

**Examiner**

ANCA EOOF

**Art Unit**

1795

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 19 March 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1,3-5 and 7-21 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,3-5 and 7-21 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-8508)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

### **DETAILED ACTION**

1. The foreign priority documents JP 2003-160478, filed on June 5, 2003, JP 2003-428853, filed on December 25, 2003 and JP 2004-57449, filed on March 02, 2004 were received and acknowledged. However, in order to benefit of the earlier filing dates, certified English translations are required.
2. Claims 1, 3-5 and 7-21 are pending. Claims 2 and 6 are canceled.

### ***Continued Examination Under 37 CFR 1.114***

3. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on March 19, 2008 has been entered.

### ***Claim Rejections - 35 USC § 102***

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

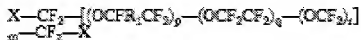
A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 1, 3 and 19 are rejected under 35 U.S.C. 102(b) as being anticipated by Kawasato et al. (US Pg-Pub 2003/0049456).

Kawasato et al. disclose a polymer having 1 or 2 reactive groups at both terminals, said polymer being represented by the formula:



(formula 1 in par.0057), wherein X may be a hydroxyl group (par.0058).

The polymer of Kawasato et al. meets the limitations of claim 1, 3 and 19 of the instant application for a first structural unit comprising a -CR<sub>1</sub>R<sub>2</sub>OH group, wherein R<sub>1</sub> and R<sub>2</sub> are electron attractive fluorine atoms and the group -CR<sub>1</sub>R<sub>2</sub>OH is bonded at the principal chain terminal.

The fact that the resin is used for a photoresist composition is an intended use of the resin and adds no patentable weight to the claim. Therefore, the polymer of Kawasato et al. is equivalent to the polymer of claims 1, 3 and 19 of the instant application.

6. Claims 1, 3, 5, 7-13, 16-17, 19 and 21 are rejected under 35 U.S.C. 102(e) as being anticipated by Hirayama et al. (US Pg-Pub 2005/0014090).

The applied reference has a common inventor with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in

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the reference was derived from the inventor of this application and is thus not the invention "by another," or by an appropriate showing under 37 CFR 1.131.

With regard to claims 1, 3 and 19, Hirayama et al. disclose a resin (A) which is a copolymer comprising groups  $-C(CF_3)_2-OH$  at the terminals (par.0170).

The group  $-C(CF_3)_2-OH$  is equivalent to the first structural unit comprising a -  $CR_1R_2 OH$  group bonded at the principal chain terminal of the resin of the instant application, wherein  $R_1$  and  $R_2$  are electron attractive trifluoromethyl ( $CF_3$ ) groups (halogenated alkyl groups).

The group  $-C(CF_3)_2OH$  (hexafluoroisopropanol) has a pKa of 9.3 therefore it meets the limitation of claims 5 and 21.

With regard to claims 7-9, Hirayama et al. further disclose that the resin (A) comprises:

- units (a1) derived from a (meth)acrylate ester containing an acid dissociable, dissolution inhibiting group:
- units (a2) derived from a (meth)acrylate ester containing a lactone unit and
- units (a3) derived from a (meth)acrylate ester containing a polycyclic group with an alcoholic hydroxyl group (par.0097-0103).

With regard to claim 10, Hirayama et al. further disclose that the resin (A) has a weight average molecular weight preferably between 8,000 and 20,000 (par.0171).

With regard to claim 11, Hirayama et al. disclose a resist composition comprising said resin (A) (abstract)

With regard to claims 12-13, Hirayama et al. disclose that the resist composition further comprises an acid generator (B) (abstract, par.0174), wherein the acid generator (B) may be an onium salt with a fluorinated alkylsulfonate ion as anion (par.0175).

With regard to claim 16, Hirayama et al. disclose that the resist composition further comprises a nitrogen-containing compound (par.0187)

With regard to claim 17, Hirayama et al. disclose a lithography process comprising the following steps of resist application, prebaking, selective exposure, post exposure baking and alkali developing (par.0064, par.0247).

7. Claims 1, 3-5, 7, 11-13, 16-17, 19 and 21 are rejected under 35 U.S.C. 102(b) as being anticipated by Przybilla et al. (SPIE, Volume 1672 Advances in Resist Technology and Processing IX, 1992).

With regard to claims 1, 3 and 19, Przybilla et al. disclose a resin for photoresist composition having a  $-C(CF_3)_2OH$  group incorporated in aromatic monomers and polymers (par. 2 on page 501 and table 3 on page 506).

The group  $-C(CF_3)_2OH$  is equivalent to the group  $-CR_1R_2OH$  of the instant application, wherein  $R_1$  and  $R_2$  are electron attractive  $-CF_3$  (trifluoromethyl) groups.

It is well-known in the art that end groups of the side chains of the polymers may be considered "terminal groups", as evidenced by Berneth et al. (US Patent 6,423,799; column 6, line 50 - column 7, line 12) and Tsuchimura et al. (US Patent 6,958,206 - claim 1). Therefore, it is the examiner's position that the  $-C(CF_3)_2OH$  group of Przybilla

et al. meets the limitations of claims 1, 3 and 19, being bonded to the polymer terminals.

With regard to claim 4, Przybilla et al. further disclose that the resins require 30-40 mol % of 2- HHFIP (2-hydroxyhexafluoroisopropyl group) in the polymer to deliver the appropriate alkaline solubility (par. 2.1 on page 501).

With regard to claim 5 and 21, Przybilla et al. disclose a resin for photoresist composition having a  $-\text{C}(\text{CF}_3)_2\text{OH}$  group incorporated in aromatic monomers and polymers (par. 2 on page 501 and table 3 on page 506).

The  $-\text{C}(\text{CF}_3)_2\text{OH}$  group meets the limitations of claims 5 and 21, having the same structure as the preferred  $-\text{CR}_1\text{R}_2\text{OH}$  group disclosed on page 20 of the instant application, where  $\text{R}_1$ ,  $\text{R}_2$  can be independently an alkyl group, a halogen atom, a halogenated alkyl group and at least one of  $\text{R}_1$  and  $\text{R}_2$  is an electron attractive group selected from the group consisting of halogen atoms and halogenated alkyl groups.

In this case,  $\text{R}_1$ ,  $\text{R}_2 = -\text{CF}_3$  (trifluoromethyl).

Absent a record to prove the contrary, the  $-\text{C}(\text{CF}_3)_2\text{OH}$  group has a pKa value within a range from 6 to 12 (MPEP 2112.01 II ).

With regard to claim 7, Przybilla et al. further disclose that the 2-HHIP (2-hydroxyhexafluoroisopropyl) group can be esterified with di-tertbutyl dicarbonate exactly as a phenolic group, creating a functional group deprotection (t-BOC) type photoresist. The use of a 50% protected homopolymer results in a resist material with high contrast and high density (par.2.2 and 2.3 on pages 502, 503).

With regard to claims 11-13, Przybilla et al. further disclose a dissolution inhibition type photoresist material containing modified styrene with 40 mol % HHIP (2-hydroxyhexafluoroisopropyl) moieties, 2,2-bis (4-(2-tert-butyloxycarbonyloxy-hexafluoroisopropyl)-styrene and triphenylsulfonium triflate as acid generator (par.2.3 on pages 502 and 503).The triflate (trifluoromethane sulfonate,  $\text{CF}_3\text{-SO}_3^-$ ) anion meets the limitations of claim 13.

With regard to claim 16, Przybilla et al. further disclose that the photoresist may comprise nitrogen-containing organic compounds, such as hexamethoxymethylmelamine as a crosslinker (par.2.4 on page 503).

With regard to claim 17, Przybilla et al. further disclose a process of forming a line & space resist pattern using a photoresist comprising poly (4-(2-tertbutyloxy-carbonyloxy-hexafluoroisopropyl)styrene-co-4-(2-hydroxyhexafluoroisopropyl)styrene). The process comprises a pre-bake step, exposure step, post-exposure bake and development (picture 1 on page 510).

8. Claims 1, 3, 5, 7-13, 16 -17, 19 and 21 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Pawlowski et al. (US 6,358,665).

With regard to claims 1, 3, 5, 19 and 21, Pawlowski et al. disclose a radiation sensitive composition containing a homopolymer or copolymers of a hydroxystyrene resin with other monomers.



Pawlowsky et al. clearly disclose preferred monomers usable herein including 3-(2-hydroxy-hexafluoropropyl-2) styrene and 4-(2-hydroxy-hexafluoropropyl-2)-styrene (column 13, line 30-column 14, line 3).

In the alternative, it would have been obvious to select 3-(2-hydroxy-hexafluoropropyl-2) styrene and 4-(2-hydroxy-hexafluoropropyl-2)-styrene as co-monomers for the hydroxyl-styrene based resin, as being clearly disclosed by Pawlowski et al. (column 13, line 30-column 14, line 3).

It is well-known in the art that end groups of the side chains of the polymers may be considered "terminal groups", as evidenced by Berneth et al. (US Patent 6,423,799; column 6, line 50 - column 7, line 12) and Tsuchimura et al. (US Patent 6,958,206 - claim 1). Therefore, it is the examiner's position that the 2-hydroxy-hexafluoroisopropyl group of Pawlowski et al. meets the limitations of claims 1, 3 and 19, being bonded to the polymer terminals.

The 2-hydroxy-hexafluoropropyl group is equivalent to the group  $-CR_1R_2OH$  of the instant application, wherein  $R_1$  and  $R_2$  are electron attractive  $-CF_3$  (trifluoromethyl) groups.

The 2-hydroxy-hexafluoropropyl group meets the limitations of claims 5 and 21, having the same structure as the preferred  $-CR_1R_2OH$  group disclosed on page 20 of the instant application, where  $R_1$ ,  $R_2$  can be independently an alkyl group, a halogen atom, a halogenated alkyl group and at least one of  $R_1$  and  $R_2$  is an electron attractive group selected from the group consisting of halogen atoms and halogenated alkyl groups. In this case,  $R_1$ ,  $R_2 = -CF_3$  (trifluoromethyl).

Absent a record to prove the contrary, the  $-\text{C}(\text{CF}_3)_2\text{OH}$  group has a pKa value within a range from 6 to 12 (MPEP 2112.01 II ).

With regard to claim 7, Pawlowski et al. further disclose that the hydroxystyrene-based resin is made alkali-soluble by protecting alkali-soluble groups on the resin with an acid cleavable protecting group (acid dissociable, dissolution inhibiting group) and disclose a variety of protective groups that could protect the phenolic hydroxyl groups and the carboxyl groups in the copolymer (column 14, lines 4-41).

With regard to claim 8, Pawlowski et al. clearly teach that the hydroxystyrene copolymers can also comprise as other monomer (meth)acrylic acid and its derivatives (such as methyl acrylate or methyl methacrylate) (column 13, lines 30-50).

In the alternative, it would have been obvious to select (meth)acrylic acid and its derivatives as co-monomers for the hydroxyl-styrene based resin, as being clearly disclosed by Pawlowski et al. (column 13, line 30-50).

Examples of hydroxystyrene based resins suitable for VDUV (193 nm) applications include co- or terpolymers of (meth)acrylates with acid-cleavable protective groups (column 14, lines 51-54). One specific example shows that 2-methyl-2-adamantyl methacrylate (2-methyl-2-adamantyl is a protective group, in accordance to column 14, lines 25-39) and mevalonic lactone methacrylate can be used as co-monomers in the hydroxystyrene-based resin (column 45, lines 28-29).

With regard to claim 9, Pawlowski et al. clearly teach that other preferred co-monomers are 4-hydroxyphenyl (meth)acrylate, 3-hydroxyphenyl(meth)acrylate, 2-hydroxyphenyl (meth)acrylate (column 13, lines 59-63).

In the alternative, it would have been obvious to select 4-hydroxyphenyl (meth)acrylate, 3-hydroxyphenyl(meth)acrylate, 2-hydroxyphenyl (meth)acrylate as co-monomers for the hydroxyl-styrene based resin, as being clearly disclosed by Pawlowski et al. (column 13, line 59-63).

With regard to claim 10, Pawlowski et al. further disclose that the resin have molecular weights in the range 2,000 to 20,000 (column 16, lines 27-28), with particular examples where the styrene-based resin has molecular weights under 12,000 (column 65).

With regard to claim 11, Pawlowski et al. further disclose chemically amplified radiation sensitive compositions comprising the hydroxystyrene-based resins (abstract).The resins comprise a homopolymers or copolymers of a hydroxystyrene resin with other monomers.

Pawlowski clearly teaches that two of the preferred monomers usable herein include 3-(2-hydroxy-hexafluoropropyl-2) styrene and 4-(2-hydroxy-hexafluoropropyl-2)-styrene (column 13, line 30-column 14, line 3).

In the alternative, it would have been obvious to select 3-(2-hydroxy-hexafluoropropyl-2) styrene and 4-(2-hydroxy-hexafluoropropyl-2)-styrene as co-monomers for the hydroxyl-styrene based resin, as being clearly disclosed by Pawlowski et al. (column 13, line 30-column 14, line 3).

With regard to claims 12 and 13, Pawlowski et al. further disclose that the chemically amplified radiation sensitive composition comprises an acid generator, which is an onium salt (abstract).The onium salt has the formula  $Y^+ ASO_3^-$ , where A represents

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CF<sub>3</sub>-CHF-CF<sub>2</sub>- or CF<sub>3</sub>-CF<sub>2</sub>-CF<sub>2</sub>-CF<sub>2</sub> - (fluorinated alkyl groups) (abstract). These fluoroalkylsulfonate anions meet the limitations of claim 13.

With respect to claim 16, Pawlowski et al. further disclose that the chemically amplified radiation sensitive composition comprises nitrogen-containing compounds, such as urea and melamine derivatives as crosslinking agents (column 17, lines 46-48).

With respect to claim 17, Pawlowski et al. further disclose that the chemically amplified radiation sensitive composition is used as a photoresist in applications where the composition is coated on various substrates, and the coated substrates are exposed to render latent images alkali soluble or alkali insoluble, followed by rinsing with an alkali to form predetermined patterns on the substrates (column 19, line 65-column 20, line 4).

### ***Claim Rejections - 35 USC § 103***

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claims 14 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pawlowski et al. (US Patent 6,358,665) as applied to claim 12 and further in view of Lamanna et al. (US Patent 5,554,664).

Pawlowski et al. disclose chemically amplified radiation sensitive compositions comprising the hydroxystyrene-based resins and an acid generator, which is an onium salt (abstract), as applied to claim 12. (see paragraph 8 of the Office Action).

Pawlowski et al. disclose that the acid generator is an onium salt and has the formula  $Y^+ ASO_3^-$ , where A represents  $CF_3-CHF-CF_2-$  or  $CF_3-CF_2-CF_2-CF_2-$  (fluorinated alkyl groups) (abstract) and can be used in combination with other photoacid generators, such as anionic sulfonium salts (column 12, line 18). The onium salt of formula  $Y^+ ASO_3^-$  above is equivalent to the acid generator (b0) of claim 15 of the instant application.

However, Pawlowski et al. fail to teach the use of sulfonium salts of bis sulfonyl imide as acid generators.

Lamanna et al. disclose the use of bis(highly fluorinated alkyl)sulfonylimide as energy-sensitive (e.g.thermal, radiation or photosensitive) initiator. These compounds have improved solubility in organic solvents, exhibit minimal corrosiveness when coating and adhesives are prepared using the compounds, generate highly reactive initiator, curative and/or catalyst upon activation by energy (abstract).

Lamanna et al. disclose that the cationic portion of the catalysts and initiators includes organic onium cations such as triarylsulfonium, wherein "aryl" is defined as an unsubstituted or substituted aromatic moiety having up to four independently selected substituents (column 5, lines 46- 51). The anionic portion includes fluorinated (highly fluorinated and perfluorinated) bisalkyl or aryl-sulfonylimide (column 6, lines 63-67).

Specific examples of anions are:  $(C_2F_5SO_2)_2N^-$ ,  $(C_4F_9SO_2)_2N^-$ ,  $(CF_3SO_2)_2N^-$ ,  $(CF_3SO_2)(C_4F_9SO_2)N^-$  (column 7, lines 45-49).

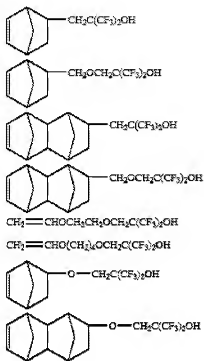
The compounds disclosed by Lamanna correspond to the acid generator (b2) of claim 14 of the instant application, where Y,Z are fluorinated methyl, ethyl or butyl groups and R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub> are aryl groups.

It would have been obvious for one of ordinary skill in the art at the time of the invention to use one of the of bis(highly fluorinated alkyl)sulfonylimide initiators of Lamanna et al. in the chemically amplified radiation sensitive compositions disclosed by Pawlowski et al., in order to take advantage of the properties of the initiator (good solubility in organic solvents, minimal corrosiveness when coating and adhesives are prepared using the compounds, generate highly reactive initiator upon activation by energy (Lamanna - abstract).

11. Claims 1, 5, 18 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Feiring et al. (US Pg-Pub 2005/0203262).

With regard to claims 18 and 20, Feiring et al. disclose a fluorinated polymer useful in photoresist compositions, said fluorinated comprising a first repeating unit (a) derived from an ethylenically unsaturated compound containing a functional group having the structure  $-X_f(CH_2)_q C(R_f)(R_r)OH$ , wherein R<sub>f</sub> and R<sub>r</sub> are the same or different C<sub>1-10</sub> fluoroalkyl groups (par.0010-0015). R<sub>f</sub> and R<sub>r</sub> must be sufficiently fluorinated to impart acidity to the hydroxyl (-OH) of the corresponding fluoroalcohol functional group, which needs to have a pKa value of 5-11.

Specific examples of co-monomer containing a fluoroalcohol functional group are given below (par.0075):



It is well-known in the art that end groups of the side chains of the polymers may be considered "terminal groups", as evidenced by Berneth et al. (US Patent 6,423,799; column 6, line 50 - column 7, line 12) and Tsuchimura et al. (US Patent 6,958,206 - claim 1). Therefore, it is the examiner's position that the fluoroalcohol functional group of Feiring et al. meets the limitations of claims 1, 3 and 19, being bonded to the polymer terminals.

This repeating unit (a) is equivalent to the first structural unit comprising  $-\text{CR}_1\text{R}_2\text{OH}$  group, where  $\text{R}_1$ ,  $\text{R}_2$  are electron attractive  $\text{C}_{1-10}$  fluoroalkyl groups, preferably  $-\text{CF}_3$  groups (as shown in the examples given above).

While Feiring et al. disclose polymers comprising the NB-F-OH as repeating unit (a) in amount between 37- 48 % (see examples in par.0173-0177), Feiring et al. also teach that the number of fluoroalcohol groups is determined for a given composition by

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optimizing the amount needed for good development in aqueous alkaline developer (par.0072).

A particular parameter must first be recognized as a result-effective variable, i.e., a variable which achieves a recognized result, before the determination of the optimum or workable ranges of said variable might be characterized as routine experimentation. *In re Antonie*, 559 F.2d 618, 195 USPQ 6 (CCPA 1977) (The claimed waste water treatment device had a tank volume to contractor area of 0.12 gal./sq. ft. The prior art did not recognize that treatment capacity is a function of the tank volume to contractor ratio, and therefore the parameter optimized was not recognized in the art to be a result-effective variable.). See also *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

As shown by Feiring et al. in par.0072, the amount of fluoroalcohol group-comprising repeating units is a result-effective variable and therefore is optimizable.

### ***Response to Amendment***

12. The rejections of claim 17 under 35 USC 112-second paragraph and 35 USC 101 are withdrawn following the applicant's amendment to the claim.

### ***Response to Arguments***

13. Applicant's arguments filed on February 18, 2008 have been fully considered but they are not persuasive for the reasons stated below:

On page 6 of the Remarks, the applicant shows that support for the amended claim 1 is on page 6, lines 16-20 of the specification of the instant application and states that " the  $-CR_1R_2OH$  group derived from the chain transfer agent can be bonded only to a principal chain terminal of a polymer of the resin".



On pages 6-7 of the Remarks, the applicant is arguing that Przybilla et al. (*SPIE*, Vol. 1672, *Advances in Resist Technology and Processing*) do not anticipate claims 1, 3-5, 7, 11-13, 16-17, 19 and 21 of the instant application, since in the resin of Przybilla et al. the  $-CR_1R_2OH$  group is bonded only at a side chain of a monomer, not at the principal chain terminal of the polymer as required by the instant application.

As shown also in paragraph 7 of the Office Action, it is well-known in the art that end groups of the side chains of the polymers may be considered "terminal groups", as evidenced by Berneth et al. (US Patent 6,423,799; column 6, line 50 - column 7, line 12) and Tsuchimura et al. (US Patent 6,958,206 - claim 1).

Therefore, it is the examiner's position that the  $-C(CF_3)_2OH$  group of Przybilla et al. meets the limitations of the instant application, being bonded to the polymer terminals.

On pages 7-8 of the Remarks, the applicant is arguing that claims 1, 3, 5, 7-13, 16-17, 19 and 21 are not anticipated, or in the alternative, obvious over Pawlowski et al. (US Patent 6,358,665), since in the resin of Pawlowski, the  $-CR_1R_2OH$  group is bonded only at a side chain of a structural unit constituting a polymer but not at a principal chain terminal of the polymer as required by the instant application.

As shown also in paragraph 8 of the Office Action, it is well-known in the art that end groups of the side chains of the polymers may be considered "terminal groups", as evidenced by Berneth et al. (US Patent 6,423,799; column 6, line 50 - column 7, line 12) and Tsuchimura et al. (US Patent 6,958,206 - claim 1).

Therefore, it is the examiner's position that the 2-hydroxy-hexafluoroisopropyl group of Pawlowski et al. meets the limitations of the instant application, being bonded to the polymer terminals.

On page 8 of the Remarks, the applicant argues the rejection of claims 14-15 under 35 USC 103 (a) over Pawlowski et al. (US Patent 6,358,665) in view of Lammana et al. (US Patent 5,554,664)

The applicant argues that Pawlowski et al. do not disclose or suggest that the group  $-CR_1R_2OH$  is bonded at the principal chain terminal of a polymer and that Lammana et al. teaches that a compound comprising an imide anion is used as a polymerization initiator activated by energy, which does not remedy the defect in the teachings of Pawlowski.

The examiner's position regarding the teachings of Pawlowski et al. is shown above. The examiner would also like to show that Lamanna et al. is only relied upon for the teachings regarding the use of a compound comprising an imide anion as acid generator, such compound having characteristics that make it desirable for photoresist compositions.

On pages 8-9 of the Remarks, the applicant argues that Feiring et al. (US Pg-Pub 2005/0203262) do not render obvious claims 18 and 20 of the instant application, since Feiring et al. do not disclose a group  $-CR_1R_2OH$  bonded at a principal chain terminal of the polymer, as required by the instant application.

As shown in paragraph 11 of the Office Action, it is well-known in the art that end groups of the side chains of the polymers may be considered "terminal groups", as

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evidenced by Berneth et al. (US Patent 6,423,799; column 6, line 50 - column 7, line 12) and Tsuchimura et al. (US Patent 6,958,206 - claim 1). Therefore, it is the examiner's position that the fluoroalcohol functional group of Feiring et al. meets the limitations of the instant application, being bonded to the polymer terminals.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anca Eoff whose telephone number is 571-272-9810. The examiner can normally be reached on Monday-Friday, 6:30 AM-4:00 PM, EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alexa Neckel can be reached on 571-272-1446. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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/A. E./

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/Cynthia H Kelly/

Supervisory Patent Examiner, Art Unit 1795